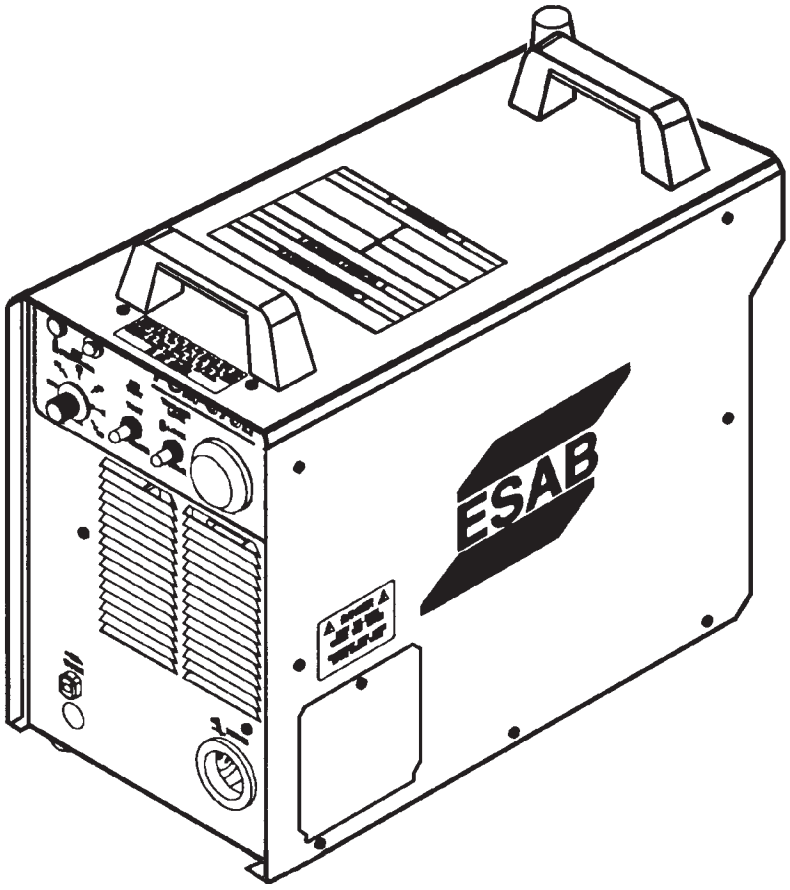
ESP-50

Plasma Arc Cutting Package



Instruction Manual (GB)

This manual provides installation and operation instructions for the following ESP-50 cutting packages starting with Serial No. :

Consoles:

P/N 0558004371 - 208/230 V, 50/60 Hz, 1 or 3-phase
P/N 0558004372 - (380-400)/460 V, 50/60 Hz, 3-phase, CE

0558004720

BE SURE THIS INFORMATION REACHES THE OPERATOR.
YOU CAN GET EXTRA COPIES THROUGH YOUR SUPPLIER.

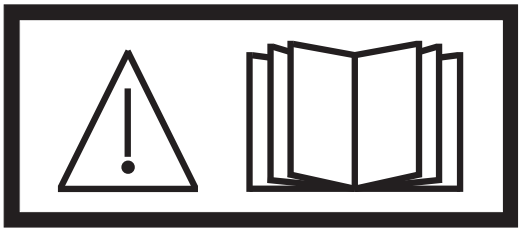
CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

TABLE OF CONTENTS

SECTION	TITLE	PAGE
SECTION 1	**SAFETY PRECAUTIONS**	77
1.0	**Safety Precautions**	77
SECTION 2	**DESCRIPTION**	79
2.1	General	79
2.2	Scope	79
2.3	Packages Available	79
2.4	Specifications	79
2.5	Ordering Information	80
2.6	Torch Data	80
2.7	Torch Specifications	82
2.8	Optional Accessories	83
2.9	Spare Parts Kits	84
SECTION 2	**INSTALLATION**	85
3.1	General	85
3.2	Equipment Required	85
3.3	Location	85
3.4	Inspection	85
3.5	Primary Electrical Input Connections	85
3.6	Secondary Electrical Output Connections	86
3.7	Connecting ESP-50 for 200(208)Vac Input	89
3.8	Connecting ESP-50 for 400(460)Vac Input	90
SECTION 3	**OPERATION**	91
4.1	ESP-50 Controls	91
4.2	Common Cutting Problems	93

TABLE OF CONTENTS

1.0 Safety Precautions

Users of ESAB welding and plasma cutting equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of welding or plasma cutting equipment. The following recommendations should be observed in addition to the standard regulations that apply to the workplace.

All work must be carried out by trained personnel well acquainted with the operation of the welding or plasma cutting equipment. Incorrect operation of the equipment may lead to hazardous situations which can result in injury to the operator and damage to the equipment.

1. Anyone who uses welding or plasma cutting equipment must be familiar with:
   - its operation
   - location of emergency stops
   - its function
   - relevant safety precautions
   - welding and / or plasma cutting

2. The operator must ensure that:
   - no unauthorized person stationed within the working area of the equipment when it is started up.
   - no one is unprotected when the arc is struck.

3. The workplace must:
   - be suitable for the purpose
   - be free from drafts

4. Personal safety equipment:
   - Always wear recommended personal safety equipment, such as safety glasses, flame proof clothing, safety gloves.
   - Do not wear loose fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns.

5. General precautions:
   - Make sure the return cable is connected securely.
   - Work on high voltage equipment **may only be carried out by a qualified electrician**.
   - Appropriate fire extinquishing equipment must be clearly marked and close at hand.
   - Lubrication and maintenance **must not** be carried out on the equipment during operation.

WARNING

WELDING AND PLASMA CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING OR CUTTING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can kill.
- Install and earth (ground) the welding or plasma cutting unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health.
- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.

ARC RAYS - Can injure eyes and burn skin.
- Protect your eyes and body. Use the correct welding / plasma cutting screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD
- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

NOISE - Excessive noise can damage hearing.
- Protect your ears. Use earmuffs or other hearing protection.
- Warn bystanders of the risk.

MALFUNCTION - Call for expert assistance in the event of malfunction.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

WARNING

Use only ESAB torches that are designed for use with this console. Use of torches not designed for use with this console could create an ELECTRIC SHOCK HAZARD. Do NOT use or modify any other torch for use on this console.

2.1 GENERAL

The ESP-50 is a compact, completely self-contained plasma cutting system. As shipped, the system is ready to cut after being connected to input power, a source of compressed air (60 - 100 psi / 4.1 - 6.9 bars) and a PT-35 torch. The ESP-50 package uses the PT-35 torch to deliver cutting power for severing materials up to 5/8 inch (15.9 mm) thick. Refer to the following paragraphs for descriptions of the ESP-50 packages available as well as performance specifications.

2.2 SCOPE

The purpose of this manual is to provide the operator with all the information required to install and operate the ESP-50 plasma arc cutting package. Technical reference material is also provided to assist in troubleshooting the cutting package.

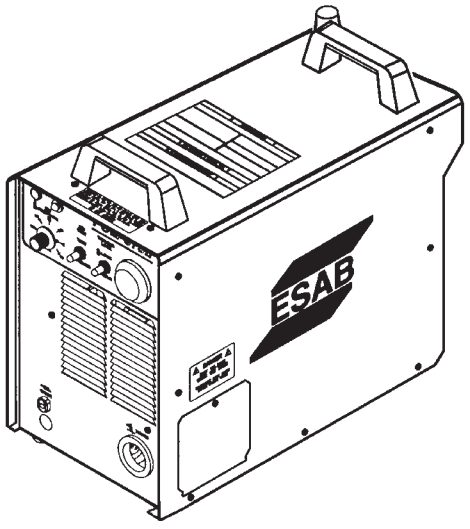
2.3 PACKAGES AVAILABLE

2.3.1 ESP-50 Mechanized Cutting Packages

The ESP-50 plasma cutting package combines the ESP-50 and PT-35 torch. A typical package includes: ESP-50 Console/Power Source, PT-35 Torch - 25' (7.6 m) or 50' (15.2 m), Torch Spare Parts Kit and a power cable. See Section 3 for installation details.

2.4 SPECIFICATIONS: ESP-50

Cuts	50 in. (12.7 mm)
1 ph. Input	208/230 vac, 1 ph, 50/60 Hz, 46/41 A
3 ph. Input	208/230 vac, 3 ph, 50/60 Hz, 22 A
	400/460 vac, 3 ph, 50/60 Hz, (10-9)/8 A
Output @ 100% duty cycle	50 amps @ 100 vac
Dimensions	W = 10.1" (275 mm)
	H = 18.3" (465 mm)
	D = 20.3" (576 mm)
Weight	85 lbs. (38.6 kg)
Minimum Air Requirements	250 cfh @ 60 psig (117.9 l/min @ 4.1 bars)



2.5 ORDERING INFORMATION:

ESP-50, 230/230 V, 25 ft. (7.6m), PT-35, with rack 0558004378
ESP-50, 208/230 V, 50 ft. (15.2m), PT-35, with rack 0558004379
ESP-50, 230/230 V, 25 ft. (7.6m), PT-35, without rack 0558004973
ESP-50, 208/230 V, 50 ft. (15.2m), PT-35, without rack 0558004974
ESP-50, 400CE/460 V, 25 ft. (7.6m), PT-35, with rack 0558004376
ESP-50, 400CE/460 V, 50 ft. (15.2m), PT- 35, with rack 0558004377
ESP-50, 400CE/460 V, 25 ft. (7.6m), PT-35, without rack 0558004374
ESP-50, 400CE/460 V, 50 ft. (15.2m), PT- 35, without rack 0558004375

The components that are included in the ESP-50 packages may be purchased separately by using the appropriate P/N when placing orders. Individual part numbers are listed below:

Consoles:
ESP-50 208/230 V, 50/60 Hz, 1/3-ph 0558004371
ESP-50 (380-400)/460 V, 50/60 Hz, 3-ph 0558004372

PT-35 Torches:
PT-35 Torch, 25 ft. (7.6m), with rack 0558004351
PT-35 Torch, 50 ft. (15.2m), with rack 0558004352
PT-35 Torch, 25 ft. (7.6m), without rack 0558004353
PT-35 Torch, 50 ft. (15.2m), without rack 0558004354

2.6 TORCH DATA

ESP-50 uses the PT-35 torch. For complete list and breakdown of parts, refer to Figure 2.1 and 2.2.

Cutting Parameters for the PT-35 Torch

CARBON STEEL

50 AMP Data, Nozzle P/N 0558004356, Heat Shield P/N 0558004357, Electrode P/N 0558005200

Metal Thickness		Travel Speed				Amps	Air Pressure		Cutting Height		Pierce Height	
		Optimum		Maximum								
in.	mm	ipm	(mm/min)	ipm	(mm/min)		psig	bar	in.	mm	in.	mm
.625	15.875	12	304	18	457	50	60	4.1	.125	3.175	NR	NR
.500	12.700	25	635	30	762	50	60	4.1	.125	3.175	NR	NR
.375	9.525	42	101	48	1219	50	60	4.1	.125	3.175	.187*	4.750
.250	6.350	82	2082	86	2184	50	60	4.1	.125	3.175	.156*	3.962
.125	3.175	150	3810	200	5080	50	60	4.1	.125	3.175	.156*	3.962
.099 (12/13 ga.)	2.515	225	5715	250	6350	50	60	4.1	.125	3.175	.125	3.175
.059 (16 ga.)	1.499	375	9525	450	11430	50	60	4.1	.125	3.175	.125	3.175
.042 (19 ga.)	1.067	450	11430	600	15240	50	60	4.1	.125	3.175	.125	3.175
.024 (24 ga.)	0.610	750+	19050+	750+	19050+	50	60	4.1	.125	3.175	.125	3.175

NR = Not Recommended
* = If using a fixed height torch or plate rider, set cutting height equal to pierce height; cutting speed may have to be reduced due to increased cut height.

Cutting Parameters for the PT-35 Torch

STAINLESS STEEL

50 AMP Data, Nozzle P/N 0558004356, Heat Shield P/N 0558004357, Electrode P/N 0558005200

Metal Thickness		Travel Speed				Amps	Air Pressure		Cutting Height		Pierce Height	
		Optimum		Maximum								
in.	mm	ipm	(mm/min)	ipm	(mm/min)		psig	bar	in.	mm	in.	mm
.500	12.700	13	330	18	457	50	60	4.1	.125	3.175	NR	NR
.375	9.525	22	558	30	762	50	60	4.1	.125	3.175	NR	NR
.250	6.350	50	1270	60	1524	50	60	4.1	.125	3.175	.187*	4.750
.188	4.763	70	1778	93	2362	50	60	4.1	.125	3.175	.187*	4.750
.125	3.175	125	3175	162	4114	50	60	4.1	.125	3.175	.156*	3.962
.105 (12/13 ga.)	2.515	172	4368	195	4953	50	60	4.1	.125	3.175	.125	3.175
.060 (16 ga.)	1.499	345	8763	390	9906	50	60	4.1	.125	3.175	.125	3.175
.043 (19 ga.)	1.067	750+	19050+	750+	19050+	50	60	4.1	.125	3.175	.125	3.175
.025 (24 ga.)	0.610	750+	19050+	750+	19050+	50	60	4.1	.125	3.175	.125	3.175

GALVANIZED STEEL

50 AMP Data, Nozzle P/N 0558004356, Heat Shield P/N 0558004357, Electrode P/N 0558005200

Metal Thickness		Travel Speed				Amps	Air Pressure		Cutting Height		Pierce Height	
		Optimum		Maximum								
in.	mm	ipm	(mm/min)	ipm	(mm/min)		psig	bar	in.	mm	in.	mm
.071 (15 ga.)	1.803	170	4318	210	5334	50	60	4.1	.125	3.175	.125	3.175
.062 (16 ga.)	1.575	315	8001	352	8940	50	60	4.1	.125	3.175	.125	3.175
.025 (25 ga.)	0.635	450	11430	750	19050	50	60	4.1	.125	3.175	.125	3.175

NR = Not Recommended

* = If using a fixed height torch or plate rider, set cutting height equal to pierce height; cutting speed may have to be reduced due to increased cut height.

Cutting Parameters for the PT-35 Torch

ALUMINUM

50 AMP Data, Nozzle P/N 0558004356, Heat Shield P/N 0558004357, Electrode P/N 0558005200

Metal Thickness		Travel Speed				Amps	Air Pressure		Cutting Height		Pierce Height	
		Optimum		Maximum								
in.	mm	ipm	(mm/min)	ipm	(mm/min)		psig	bar	in.	mm	in.	mm
.500	12.700	21	533	30	762	50	60	4.1	.125	3.175	NR	NR
.375	9.525	36	914	45	1143	50	60	4.1	.125	3.175	NR	NR
.313	7.950	50	1270	57	1447	50	60	4.1	.125	3.175	.250*	6.350
.250	6.350	72	1828	87	2209	50	60	4.1	.125	3.175	.188*	4.775
.188	4.763	110	2794	150	3810	50	60	4.1	.125	3.175	.156*	3.962
.125	3.175	200	5080	230	5842	50	60	4.1	.125	3.175	.156*	3.962
.095 (10/11 ga.)	2.413	275	6985	300	7620	50	60	4.1	.125	3.175	.125	3.175
.049 (16 ga.)	1.245	420	10668	465	11811	50	60	4.1	.125	3.175	.125	3.175
.043 (17 ga.)	1.092	450	11430	502	12750	50	60	4.1	.125	3.175	.125	3.175
.031 (20 ga.)	0.762	750+	19050+	750+	19050+	50	60	4.1	.125	3.175	.125	3.175

NR = Not Recommended

* = If using a fixed height torch or plate rider, set cutting height equal to pierce height; cutting speed may have to be reduced due to increased cut height.

2.7 TORCH SPECIFICATIONS:

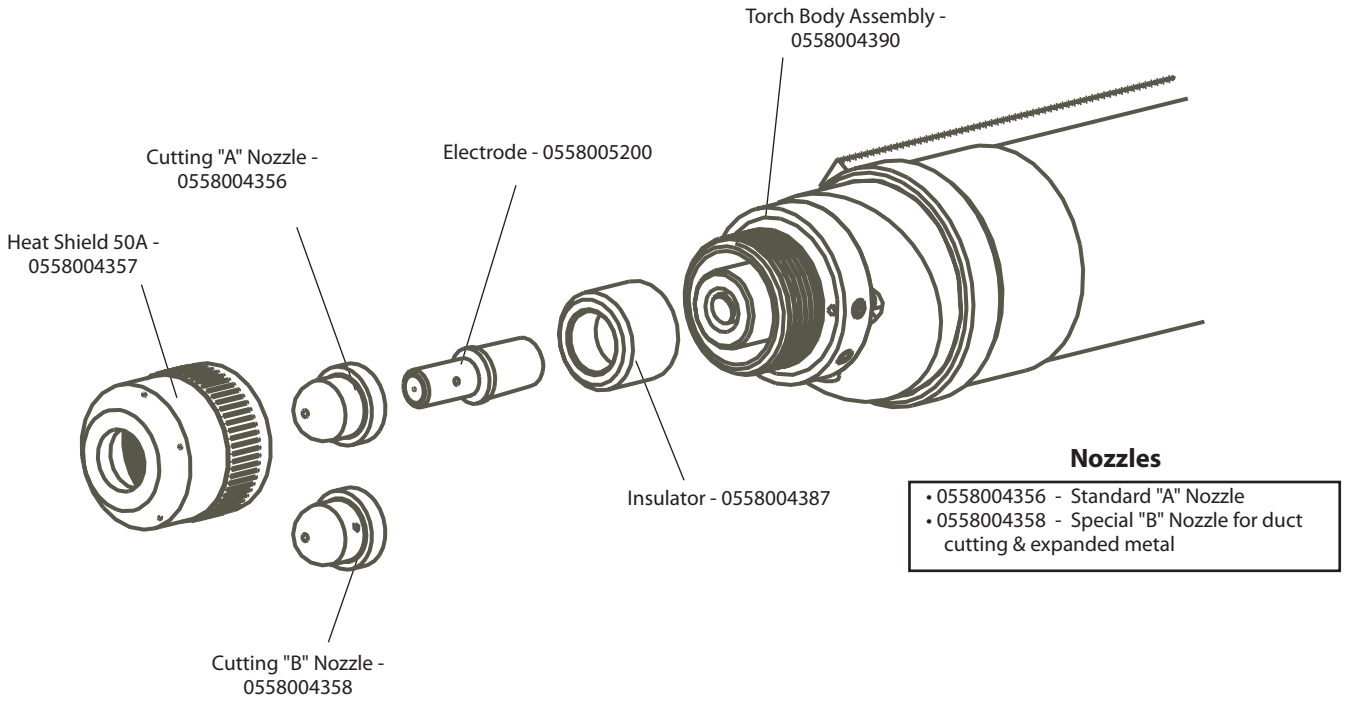

Torch Body Assembly - 0558004390
Cutting "A" Nozzle - 0558004356
Electrode - 0558005200
Heat Shield 50A - 0558004357
Insulator - 0558004387
Cutting "B" Nozzle - 0558004358
Nozzles
• 0558004356 - Standard "A" Nozzle
• 0558004358 - Special "B" Nozzle for duct cutting & expanded metal

Figure 2-1. PT-35 Torch

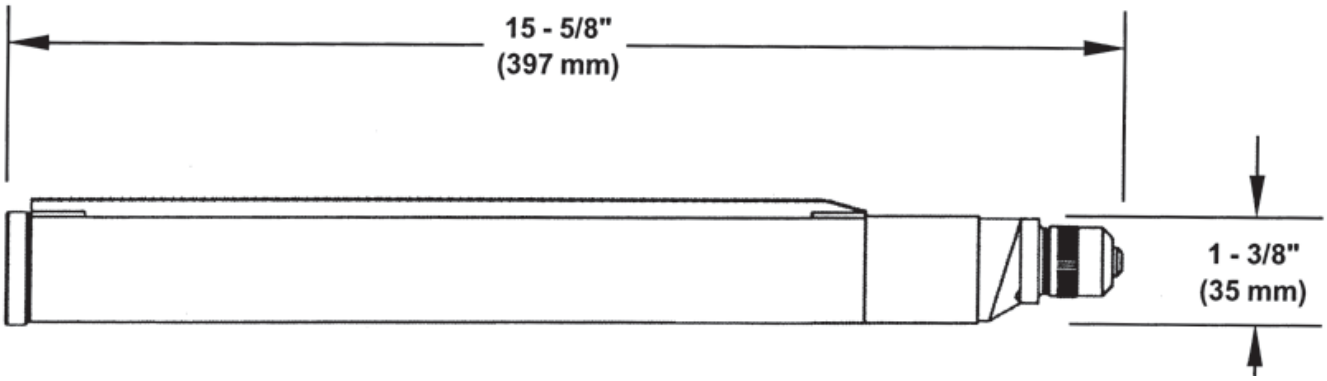


Figure 2-2. PT-35 Dimensions

2.8 OPTIONAL ACCESSORIES:

Plasma Flow Measuring Kit:

This valuable troubleshooting tool allows measurement of the actual plasma gas flow through the torch 19765 (0558000739)

(NOTE: Part numbers in parenthesis apply to "CE"/European units only.)

CNC Cable 50' 0558004366

Adaptor Cable - Adaptor to directly connect HT or TD control cable to ESP-50..... 0558004363

Torch Holder Assembly 16V83 (0558004250)

Plate Rider - height control for PT-35..... 0560936972

Standoff Tool - Designed for use with Plate Rider for setting nozzle standoff height. Can also be used separately. 0558004364

2.9 SPARE PARTS KITS:

50 A Spare Parts Kit 0558005210

PT-35, 50 A, Spare Parts Kit, P/N 0558005210
Contents:

Description	P/N	Quantity
Shield, Retaining	0558004357	1
50 amp "A" Nozzle	0558004356	4
Electrode	0558005200	6
Fuse 2amp, 600vdc	0558003075	1
Insulator	0558004387	1

Consumable Value Pack 0558005203

Consumable Value Pack, P/N 0558005203
Contents:

Description	P/N	Quantity
Electrode	0558005200	10
50 amp "A" Nozzle	0558004356	15

Consumable Set 0558005201

Consumable Set, P/N 0558005201
Contents:

Description	P/N	Quantity
Electrode	0558005200	1
50 amp "A" Nozzle	0558004356	1

Consumable Set 0558005202

Consumable Set, P/N 0558005202
Contents:

Description	P/N	Quantity
Electrode	0558005200	1
50 amp "B" Nozzle	0558004358	1

3.1 GENERAL

CAUTION

Installing or placing any type of filtering device will restrict the volume of intake air, thereby subjecting the power source internal components to overheating. The warranty is void if any type of filter device is used.

Proper installation is important for satisfactory and trouble-free operation of the ESP-50 cutting package. It is suggested that each step in this section be studied carefully and followed closely.

3.2 EQUIPMENT REQUIRED

A source of clean, dry air that supplies 250 cfh (118.0 l/m) at 60-75 psig (4.1 - 5.2 bars) is required for the cutting operation. The air supply should not exceed 150 psig (10.3 bars) (the maximum inlet pressure rating of the air filter-regulator supplied with the package).

3.3 LOCATION

Adequate ventilation is necessary to provide proper cooling of the ESP-50. The amount of dirt, dust, and excessive heat to which the equipment is exposed, should be minimized. There should be at least one foot of clearance between the ESP-50 power source and wall or any other obstruction to allow freedom of air movement through the power source.

3.4 INSPECTION

A. Remove the shipping container and all packing material and inspect for evidence of concealed damage which may not have been apparent upon receipt of the ESP-50. Notify the carrier of any defects or damage at once.
B. Check container for any loose parts prior to disposing of shipping materials.
C. Check air louvers and any other openings to ensure that any obstruction is removed.

3.5 PRIMARY ELECTRICAL INPUT CONNECTIONS (FIGURE 3-2)

WARNING

ELECTRIC SHOCK CAN KILL! Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch and by unplugging the power cord to the unit when connections are made inside of the power source.

CAUTION

Be sure that the power source is properly configured for your input power supply. DO NOT connect a power source configured for 208/230 V to a 460 V input power supply. Damage to the machine may occur.

NOTE: If using 200(208) V input power, the ESP-50 must be reconnected for 200 V use as directed in Section 3.7 and Figure 3-4.

If using (380-400) V input power, the ESP-50 must be reconnected as directed in Section 3.8, Figure 3-5.

WARNING

The chassis must be connected to an approved electrical ground. Failure to do so may result in electrical shock, severe burns or death.

NOTE: The 208/230 V models are equipped with a plug for single-phase connection only. The plug is mounted to a 4-conductor cable. If 3-phase connection is desired, remove the plug and proceed as described.

A line (wall) disconnect switch with fuses or circuit breakers should be provided at the main power panel (see Table 3-1 for fuse sizes). The input power cable of the console may be connected directly to the disconnect switch or you may purchase a proper plug and receptacle from a local electrical supplier. If using plug/receptacle combination, see Table 3-1 for recommended input conductors for connecting receptacle to line disconnect switch.

3.6 SECONDARY ELECTRICAL OUTPUT CONNECTIONS (FIGURE 3-2)

1. For operator safety, the torch connections are located on the output terminal board behind the lower portion of the front panel. Remove access door to output terminal board from right panel of power source.
2. Thread the power cable & pilot arc cable of the PT-35 through the right open bushing of the front panel. Connect power cable to the torch fitting (left-hand threads); bolt the pilot arc cable ring connection to the copper terminal. Make sure the power and pilot arc cable connections are wrench-tight.
3. Reassemble the access door to the power source.
4. Connect your air supply to the inlet connection of the filter-regulator.
5. Clamp the work cable to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable.

WARNING

Before making any connections to the power source output terminals, make sure that all primary input power to the power source is deenergized (off) at the main disconnect switch and that the input power cable is unplugged.

Input Requirements			Input & Gnd	Fuse
Volts	Phase	Amps	Conductor	Size
			CU/AWG	Amps
208	1	55A	6	80
208	3	26A/Ph.	6	50
230	1	49A	6	80
230	3	24A/Ph.	6	50
400	3	13	10	25
460	3	11	10	25

Table 3-1. Recommended Sizes For Input Conductors and Line Fuses

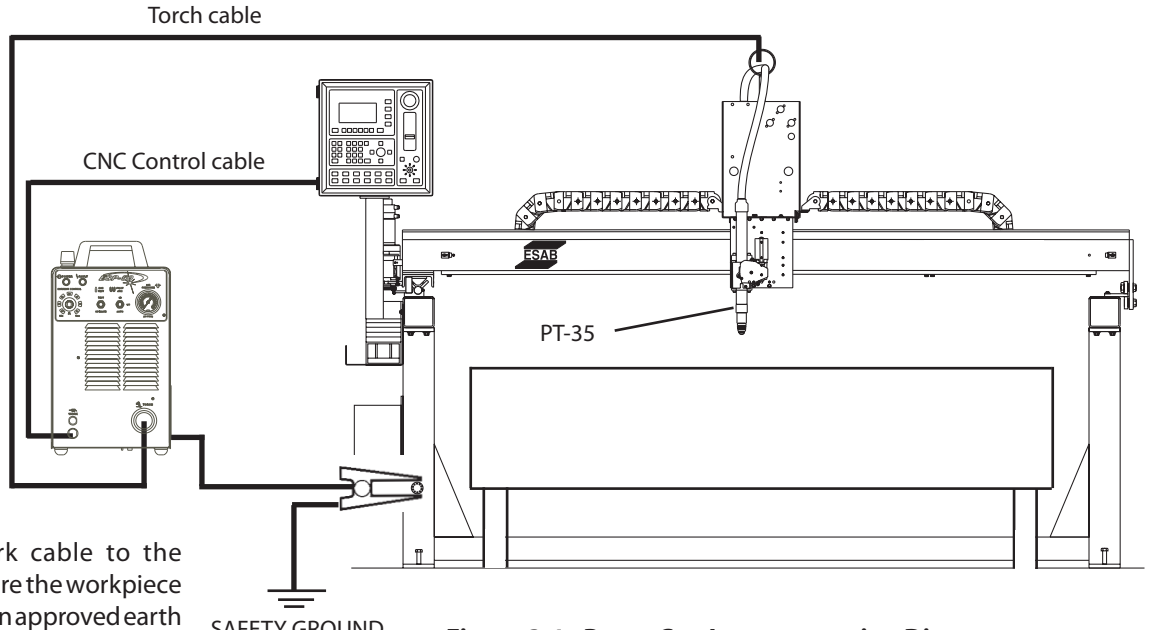
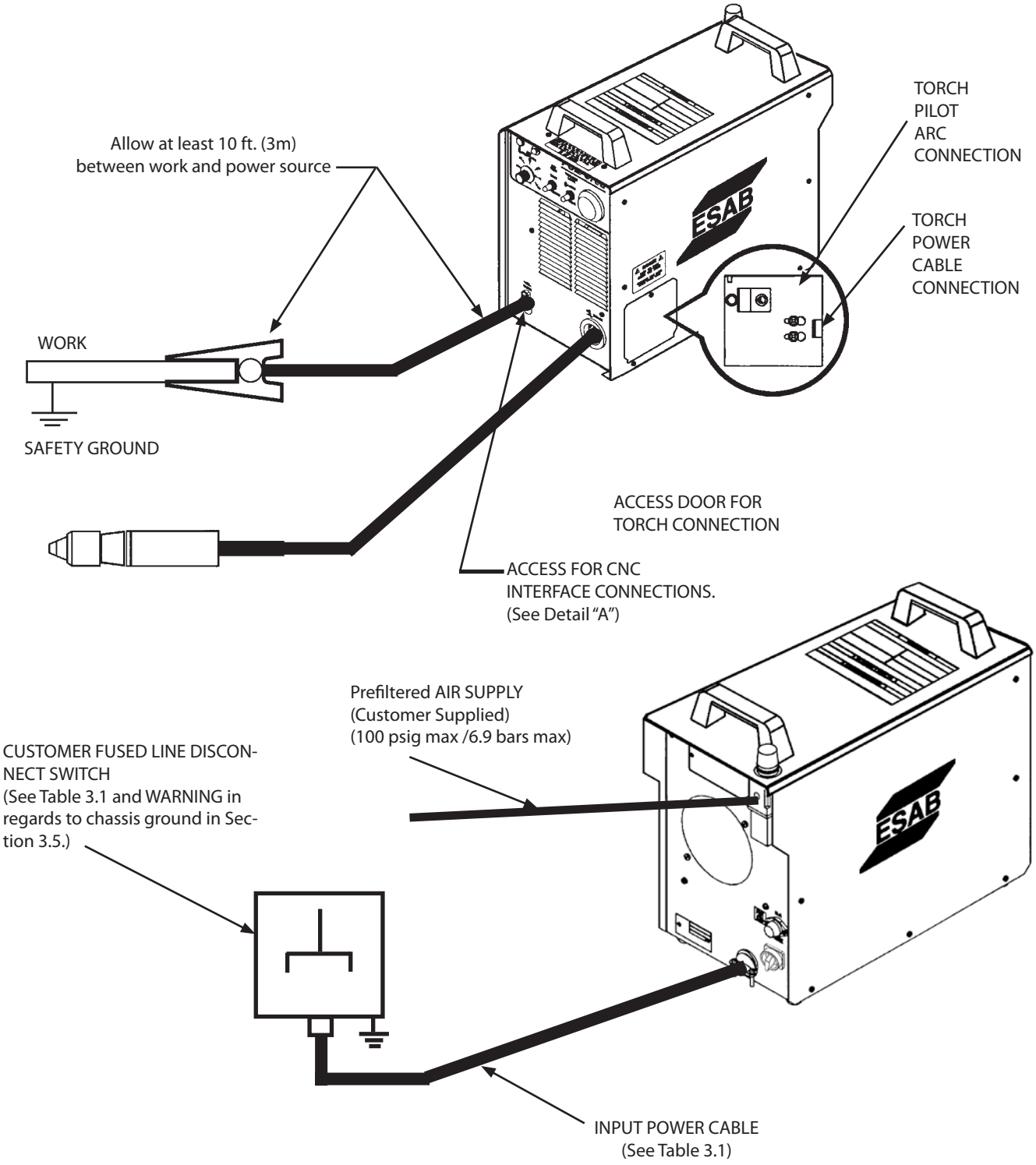


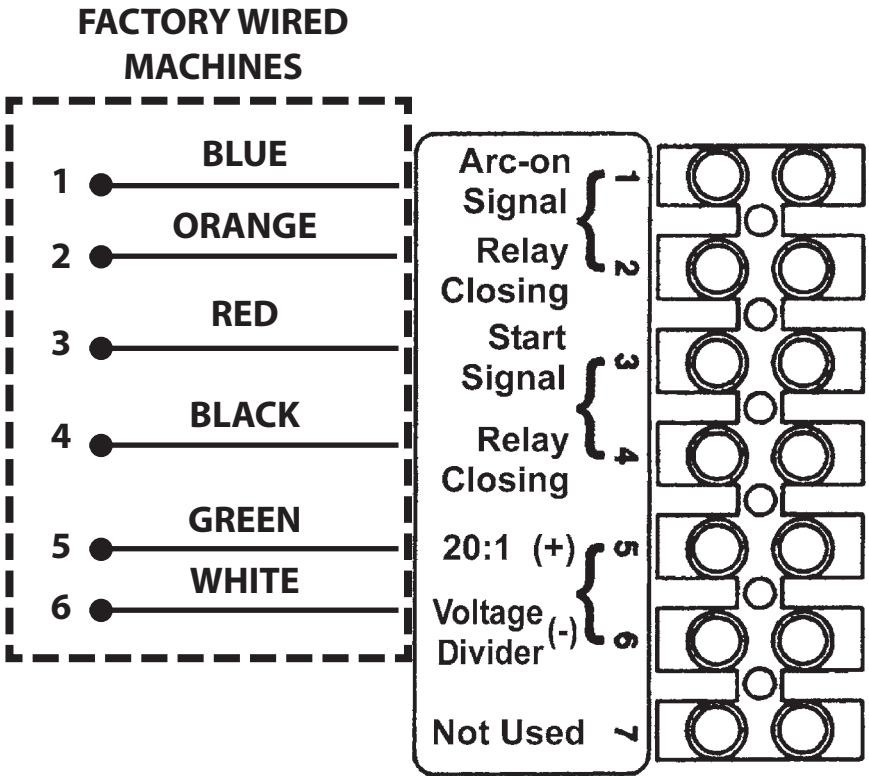
Figure 3-1. PowerCut Interconnection Diagram

Clamp the work cable to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable.



NOTE: The 208/230 V models are equipped with a plug for single-phase connection only. The plug is mounted to a 4-conductor cable. If 3-phase connection is desired, remove and discard the plug and refer to Sect. 3.5.

Figure 3-2. ESP-50 Interconnection Diagram



DETAIL "A"

Figure 3.3 - MECHANICAL CUTTING INTERFACE DIAGRAM
CNC Interface Connection (Located inside console, left side of base.)

3.7 CONNECTING ESP-50 FOR 200(208) VAC INPUT

WARNING

ELECTRIC SHOCK CAN KILL! Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch and by unplugging the power cord to the unit when primary electrical connections are made to the power supply.

The ESP-50 power source with 200/230 vac, single-phase input capability is factory set for 230 vac input. If using 200(208) vac input, the ESP-50 must be reconnected as follows before connecting to your input power:

1. Remove the cover from the ESP-50 power source.
2. Locate the Input Bridge (IBR) and TB5 terminal block (see Figure 3.4.A) on the left side towards the rear panel. Disconnect the gray lead from TB5-2 and then connect it to TB5-1.
3. Locate the output bridge (D1) on left side towards the front panel (see Figure 3.4.B). Disconnect and swap leads X2 and X3 from the main transformer. For 200(208) vac input, X2 is connected to TB3 and X3 is connected to terminal 3 of D1. Make sure the connections are firmly tightened.
4. Leave all other wires the same.
5. Reinstall the cover and connect the ESP-50 to 208 vac input power.

Note: Factory set for 230 VAC input.
For 208VAC move GRY wire from TB5-2 to TB5-1, move T1-X2 to TB3 and T1-X3 to D1-3

Figure 3.4.A

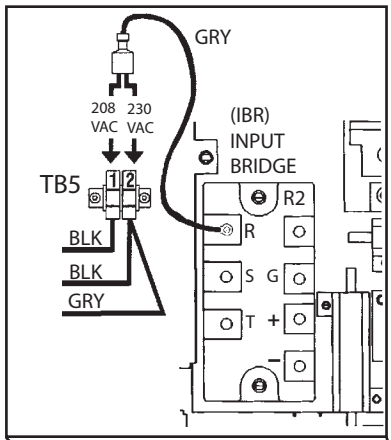
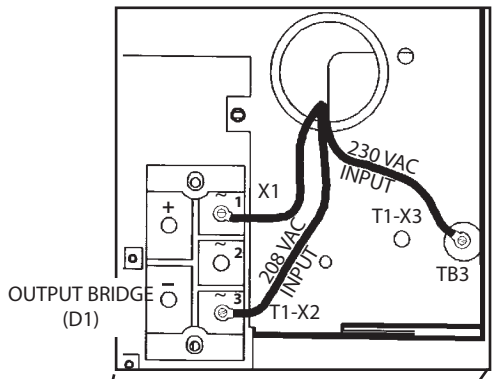


Figure 3.4.B



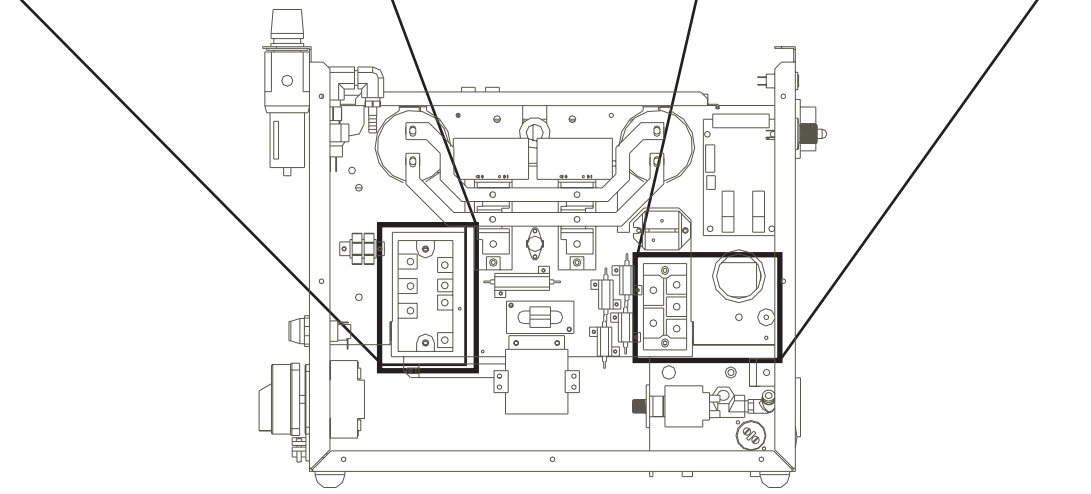


Figure 3-4. Original Factory Setup for 230 Vac Input on Power Source with 200/230 Vac Input Power Capability

3.8 CONNECTING ESP-50 FOR 400/460 VAC INPUT

WARNING

ELECTRIC SHOCK CAN KILL! Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch and by unplugging the power cord to the unit when primary electrical connections are made to the power supply.

The ESP-50 power source with (380-400)/460 vac, 3-phase input capability is factory set for 460 vac input. If using 400 vac input, the ESP-50 must be reconnected as follows before connecting to your input power:

1. Remove cover from the ESP-50 power source.
2. Locate the Input Bridge (IBR) and TB5 terminal block (see Figure 3.5.A) on the left side towards the rear panel. Disconnect the gray lead from TB5-2 and then connect it to TB5-1.
3. Locate the output bridge (D1) on left side towards the front panel (see Figure 3.5.B). Disconnect and swap leads X2 and X3 from the main transformer. For 400 vac input, X2 is connected to TB3 and X3 is connected to terminal 3 of D1. Make sure the connections are firmly tightened.
4. Leave all other wires the same.
5. Reinstall cover and connect the ESP-50 to 400 vac input power.

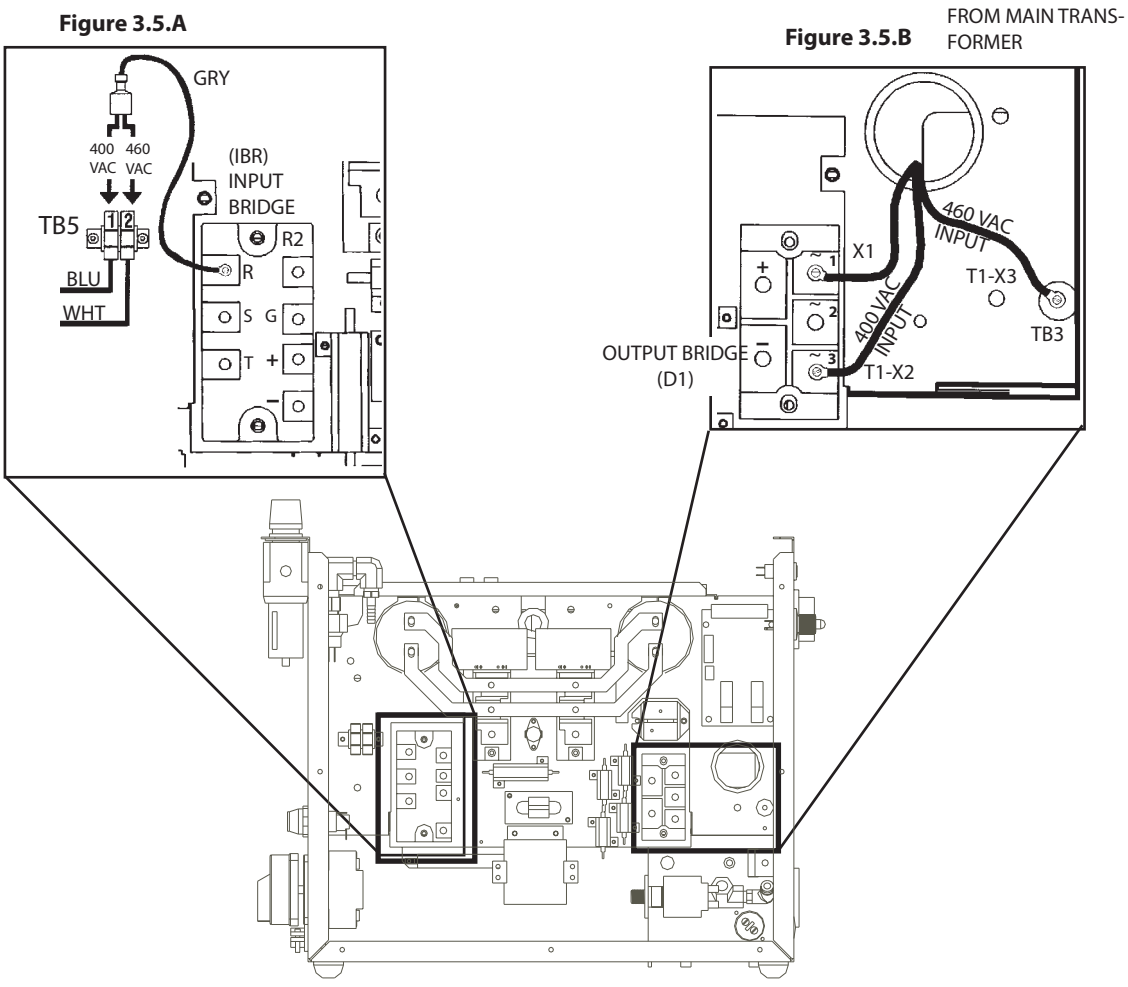


Figure 3-5. Original Factory Setup for 460 Vac Input on Power Source with 400/460 Vac Input Power Capability

4.1 ESP-50 CONTROLS (FIGURE 4-1)

WARNING

ELECTRIC SHOCK can kill.
- **Do NOT operate the unit with the cover removed.**
- **Do NOT apply power to the unit while holding or carrying the unit.**
- **Do NOT touch any torch parts forward of the torch handle (nozzle, heat shield, electrode, etc.) with power switch on.**

WARNING

ARC RAYS can burn eyes and skin; NOISE can damage hearing.
- **Wear welding helmet with No. 6 or 7 lens shade.**
- **Wear eye, ear, and body protection.**

CAUTION

Position the ESP-50 at least 10 feet (3 meters) from the cutting area. Sparks and hot slag from the cutting operation can damage the unit.

A. Power Switch (located on rear panel). When placed in ON position, the white pilot light will glow indicating control circuit is energized and the cooling fan will run.

B. Output Current Control. Adjustable from 20 to 50 amperes.

C. Air Test Switch. When placed in Test position, air filter-regulator can be adjusted to desired pressure (60 - 75 psig / 4.1 - 5.2 bars) before cutting operations. Allow air to flow for a few minutes. This should remove any condensation that may have accumulated during shutdown period. Be sure to place switch in OPERATE position before starting cutting operations.

D. Pilot Arc Select Switch.

Hi: Set pilot arc current level to "High" when improved stability is needed. May lessen consumable life.

Low: Maintains "Low" pilot arc current level. May improve consumable life.

Auto: Adjusts pilot arc based on output current selected. Use for standard cutting.

E. Fault Light. Will glow amber under the following conditions and operations will come to a complete stop.

Start Signal: On power-up, fault light will be on continuously when a start signal is present. Remove start signal to reset.

Parts in Place Fault: The fault light will be on **continuously** at power-up. This indicates missing or worn consumables. Turn power off and inspect torch.

Over Temperature: The fault light will be **mostly off** but will flick on for about 1/10th of a second every second. This indicates that the duty cycle has been exceeded. Allow the power source to cool down before continuing to operate.

High/Low Line Voltage: The fault light will **rapidly blink on and off** (five times per second). This indicates that the input voltage is outside the "+ or -" 15% range of the input rating.

Over-Current: The fault light will be on **continuously**. This indicates that input current has been exceeded.

All fault signals will remain on for a minimum of 10 seconds. If fault clears, all will reset automatically except for over-current. To clear over-current, the power must be shut off for 5 seconds and then turned back on.

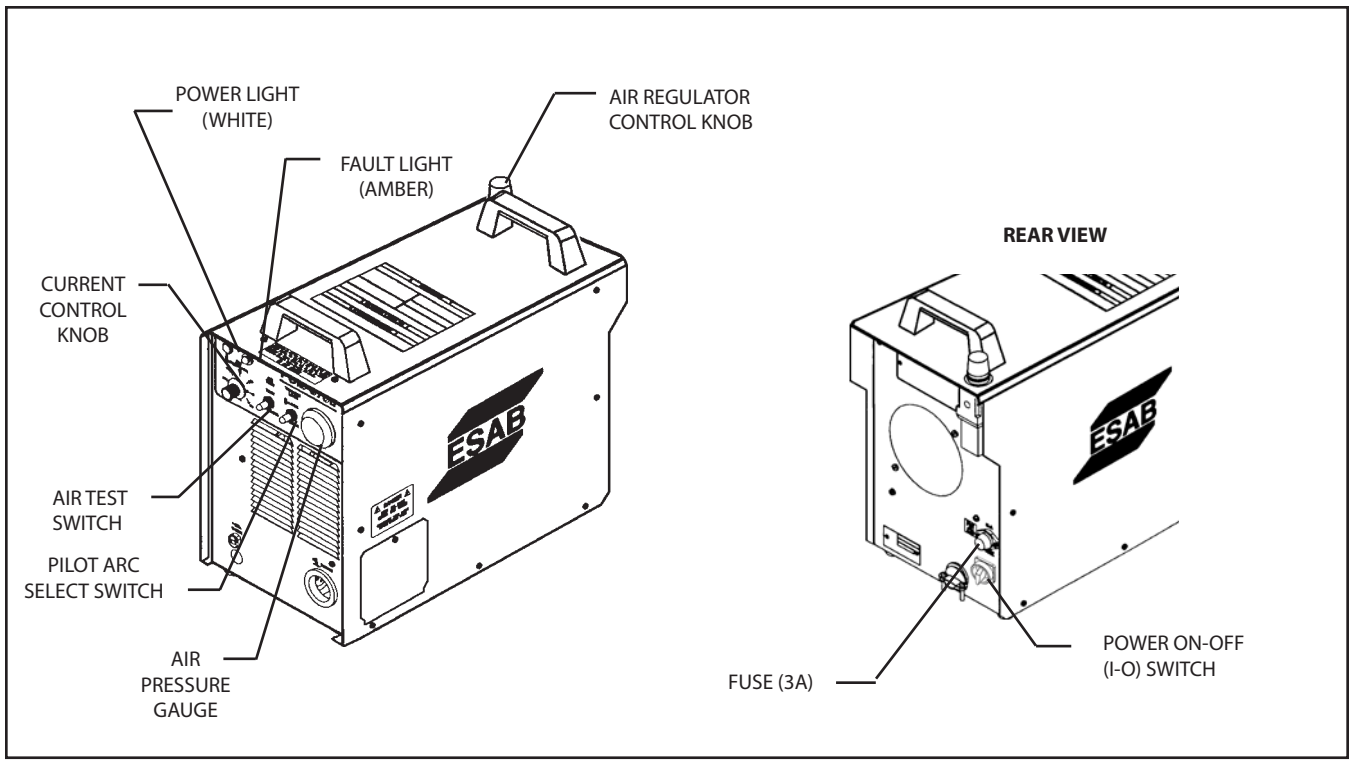


Figure 4-1. ESP-50 Controls

CAUTION

REPLACE ELECTRODE BEFORE LENGTH BECOMES SHORTER THAN .060" INCH (1.5 MM)

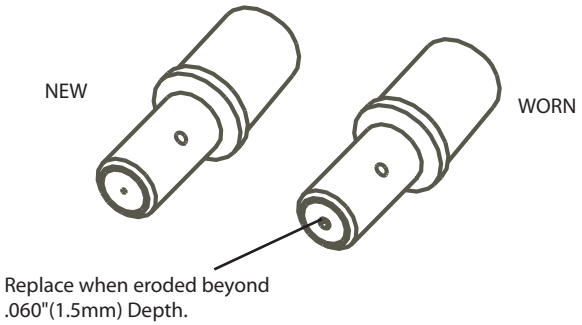


Figure 4-2. Electrode Wear Limit

NOTE: When replacing the nozzle, always inspect the electrode for wear. If electrode wear is greater than .060" (1.5 mm), replace the electrode. If the electrode is used beyond this recommended wear limit, damage to the torch and power source may occur. Nozzle life is also greatly reduced when using the electrode beyond the recommended limit. Refer to Figure 4-2.

4.2 COMMON CUTTING PROBLEMS

Listed below are common cutting problems followed by the probable cause of each. If problems are determined to be caused by the ESP-50, refer to the maintenance section of this manual. If the problem is not corrected after referring to the maintenance section, contact your ESAB distributor.

A. Insufficient Penetration.

1. Current too low.
2. Cutting speed too fast.
3. Damaged cutting nozzle.
4. Improper air pressure.
5. Low air flow rate.

B. Main Arc Extinguishes.

1. Cutting speed too slow.
2. Worn electrode.

C. Dross Formation. (In some materials and thicknesses, it may be impossible to get dross-free cuts.)

1. Current too low.
2. Cutting speed too fast or too slow.
3. Improper air pressure.
4. Faulty nozzle or electrode.
5. Low air flow rate.

D. Double Arcing. (Damaged Nozzle Orifice.)

1. Low air pressure.
2. Damaged cutting nozzle.
3. Loose cutting nozzle.
4. Heavy spatter accumulation on nozzle.

E. Uneven Arc.

1. Damaged cutting nozzle or worn electrode.

F. Unstable Cutting Conditions.

1. Incorrect cutting speed.
2. Loose cable or hose connections.
3. Electrode and/or cutting nozzle in poor condition.

G. Main Arc Does Not Strike.

1. Worn electrode.
2. Loose connections.
3. Work cable not attached.

H. Poor Consumable Life.

1. Improper gas pressure.
2. Contaminated air supply.
3. Low air flow rate.